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by Braz Walker

Earl Schneider, editor

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1 2 3 4 5 6 7 8 9 10

CONTENTS

- | | | |
|---|-----------------------------|---------|
| 1 | Introduction | page 3 |
| 2 | Methods of collecting | page 5 |
| 3 | Native aquarium maintenance | page 9 |
| 4 | Diseases | page 13 |
| 5 | Spawning native fishes | page 14 |
| 6 | Suitable aquarium fishes | page 18 |

Cover: Red Shiner, *Notropis lutrensis*

BARRY POWELL



Red Shiner, *Notropis lutrensis*. In the breeding season, males approach the beauty of any tropical fish.

1 Introduction

Aquarium lovers, for the most part, have confined themselves to collecting colored tropical fishes and those fantastically shaped and finned goldfishes which originated in the Far East. There seems to be some magic in the word *imported* which makes them somehow seem more exotic, more desirable.

And yet the ponds, streams and lakes of America abound in species of fishes which are just as interesting, just as colorful and just as desirable as the foreigners.

Certainly the Snakehead is odd-looking, but have you seen a Bowfin? The Platies are pretty, but so are our Bluefin Killifishes and Red Shiners and, as for interesting breeding habits, the American Flagfish and Pygmy Sunfish will rival the Cichlids and Anabantids.

In Europe, where native American fishes are foreigners, many of them are considered highly desirable and are eagerly sought.

Collect your own

Of course, keeping natives does require a little more effort on



TOM GENELLI

Johnny Darter, *Etheostoma nigrum*. The most common Darter of our Eastern streams. Generations of boys have enjoyed fishing for Darters with bent pins in the spring.

the part of the hobbyist; he cannot just go down to the corner store with money and bring his choice home. For native fishes he may be forced to travel out into the countryside, to inhale fresh air and commune with nature, often for hours at a time, exert himself chasing some elusive minnow and return home at night with no more to show for his troubles than a few small but pretty fishes in a plastic bag (hardly enough to feed his cat), a suntan, and a feeling of well-being.

Sounds like fun, doesn't it! The effort will also give added value to your captives. You didn't just *buy* them, you worked for them.

Native fishes are widely available

Although pollution has made collecting more difficult in certain areas, most homes are hardly more than a few minutes away from a stream or pond where fishes suitable for aquarium-keeping can be found. Even neighborhood parks in our large cities usually support resident populations of native fishes. Small bodies of water are generally more desirable since not only are fishes easier to capture but they are usually smaller in size depending on the species. In most parts of the U.S. the Mosquitofish, *Gambusia affinis*, can be found in almost every body of water which neither freezes solid nor is so unbearably contaminated as to be unliveable even for these tenacious little creatures. Small creeks and streams may offer minnows or killifishes, or an occasional sunfish or catfish, while larger streams have a larger

variety. Perches of larger species frequent the same locales as sunfishes in the North and parts of the South, while darters are usually found in the clearer running streams and springs. Depending on the method you use, any body of water capable of supporting fish life is a potential collecting area.

2 Methods of collecting

The most effective method of collecting your fish makes use of an ordinary minnow seine. These can be purchased from sporting goods stores or large mail order firms and consist of a length of fine mesh netting, which is usually three or four feet wide, with the length varying according to the user's need. There are cords on each end for attaching to a pair of poles so that the net may be pulled through the water. Across the upper length of the net is a series of floats and across the lower, a series of weights so that the net will not collapse as it is pulled through the water. Seines require two people who, holding the extended seine vertical by means of the poles, move slowly through the water. The weights cause the lower edge to drag the bottom, while the floats cause the seine to extend to the surface. The object is to herd the fish ahead, usually up a shelving bank. As the water shallows the fish mill about, usually in the belly of the seine, at which time the bottom edge is lifted. The now horizontal seine is carried up on the bank to be pawed over with "oohs" and "ahs" of satisfaction as some particularly pretty treasure is discovered. Always be sure to return those specimens not being kept promptly to the water to avoid injury to them.

Stream collecting

Small, shallow streams can be easily worked in warm weather by two persons. A good location is a narrow portion of the stream with a "dead end" of one kind or another, such as a waterfall or a small dam. If none is present, a small dam can even be constructed for the purpose, forming a sort of "corral" into which the fishes can be herded. Seiners should move upstream against the current so that when the fishes come to the dead end,

they must turn downstream into the oncoming seine. The seine should be rolled in on the ends if wider than the stream so that its length is slightly greater than the stream is wide, allowing the seiners to keep as close to the bank as possible on both sides. In this way most of the fishes cannot employ an "end run" and escape.

The ends of the minnow seine should be rolled as neatly as possible so that the weighted lower end of the seine will be within an inch or so of the lower end of each pole, otherwise the fish will escape under the net. If possible, a flat bottom is best for seining since many fishes will dart under rocks, sticks or other obstructions and will be passed over.

When the fishes are finally hemmed in, the last few steps should be made rapidly as soon as they turn downstream. Depending on conditions, either one seiner can stop while the other makes a rapid sweep finally ending up on the same side, or both can continue upstream, lifting the seine from the water in the final sweep.

Don't be greedy. Keep only a reasonable number of fishes for which you can provide adequate space and you will have a better chance of success.

Hand nets

For the "loner," a large hand net like those used by goldfish dealers, but with a broomstick handle fastened on to extend it, can be an effective fish catching device. Fishes which lurk in weeds or other obstructed or restricted areas can often be dipped up by a collector who is both patient and swift of hand. Often just scooping up netfuls of weed and then sorting patiently through them can be productive. In some cases, fishes can be obtained with hand nets which would not otherwise be captured.

Traps

Probably the laziest technique next to buying specimens from a bait dealer is to use one or more minnow traps. Plastic funnel-shaped inserts can be purchased which fit the lid of an ordinary Mason jar exactly. These are inserted funneling inward and



KLAUS PATYAN

Blackbanded Sunfish, *Mesogonistius chaetodon*. These sparkling gems turn up in seines when working the sluggish streams of southern New Jersey and Maryland.

secured by screwing on the threaded ring portion of the lid. Food, which can consist of anything from meat to chicken feed, is placed inside the jar and the jar located in a likely place in the water. In running water, the mouth should face downstream. The smell attracts downstream or nearby fish which enter the jar easily through the funnel but find themselves unable to get out.

Throw nets

For those willing to acquire the necessary skill, a throw net can be excellent. A baited "draw net" or a small "one man" net can also be effective. Also particularly effective is a lift net. Proper use of this also requires a bit of practice to condition your reflexes. A lift net is a thirty-inch to four-foot square of mesh with diagonal metal stiffeners. Cords lead from each corner to the lift rope. The net is lowered to the bottom with bait in the center. When fish swim over, the net is quickly lifted—hopefully with the fish in it.

Bent pins

There is also something to be said for the bent pin. Using a light pole cut from a branch and fine nylon thread, it is easy to develop a technique for snatching a small fish out of the water. A bit of



TOM GENELLI

Pumpkinseed, *Lepomis gibbosus*. A very colorful "sunfish," extremely common in the Northeastern section of the United States.

worm or meat may be used for bait. As there is no barb, the hook can be removed with a minimum of damage. The lack of a barb, however, makes speed and a taut line essential as otherwise the fish will throw the hook.

Transporting the catch

Plastic bags afford the most convenient method for transporting fishes. Always be sure to allow adequate room, put in fresh water from the stream just before leaving and, if at all possible, keep your specimens cool on the way home. It is also essential to keep your catch shaded from the sun if they are to survive. Introduction into the aquarium should be gradual, by mixing small amounts of aquarium water with the transport water over a period of one-half hour.

For those more prone to fish watching than fish collecting, neighborhood boys are usually interested in local bodies of water and are more than willing to collect fish for a small compensation. Minnow dealers sometimes find odd species in their bait tanks which are considered worthless and are often tossed to a pet cat.

Observe the law

Of primary importance in collecting is to check thoroughly on local restrictions concerning game fishes and minnows. Certain fishes may be protected by law and seining may be restricted in certain waters.



VAN DEN NIEUWENHUIZEN

Green Sailfin Mollies, *Poecilia (Mollienesia) latipinna*. Coming from the Southern states, these will tolerate a wide temperature range but require a good deal of swimming space. Only the male possesses the magnificent "sail."

3 Native aquarium maintenance

Just as do people, fishes have basic requirements which must be considered if they are to remain healthy: In the confined area of an aquarium these basic requirements become doubly important since, even under the best conditions, a number of beneficial factors which exist in nature cannot be duplicated.

Keep it clean

Perhaps most obvious, but also most important, is cleanliness. A

clean aquarium has a better chance of success. Not only will it support more fishes than an unclean one, but there is less possibility of disease. A fast-flowing, efficient filter will aid tremendously in removing detritus such as waste from the fish and will keep the water clear unless gross overfeeding occurs. It will also increase the number of fishes that the aquarium will adequately accommodate. An air stone will further increase the fish-carrying capacity of the aquarium and lessen the possibility of cloudy water.

Clear water is not necessarily "clean" water. When water is first introduced into the aquarium, there is a sparkling, almost bluish or greenish cast to it when sunlight reflects through it. As water containing living fishes "ages," it takes on a yellowish tinge. Although the water remains clear, the color change is an indication of a chemical buildup of soluble materials which may eventually become detrimental to fishes.

When water begins to turn brown or yellow, many fishes become rather sluggish, do not carry their fins well and do not seem to feed as heavily as usual. Although a number of native aquarium fishes such as the Blackbanded Sunfish, *Mesogonistius chaetodon*, live normally in acid, brownish-colored water, there are few which will not respond favorably to at least a partial change of water when this condition occurs in the aquarium.

Almost immediately after the change, colors intensify, activity increases, and appetites return to normal. This stimulus is similar to the effect which a fresh influx of water from a rainfall has on fishes in nature.

Chlorine

As in any aquarium, new water should be chlorine free and approximately the same temperature as the old. Chlorine is easily removed with the addition of sodium thiosulfate, available from photographic dealers as "hypo" (1 gram per gallon of water), or with a number of commercial preparations sold for the purpose. Freshly-drawn water contains an excess of dissolved gases such as nitrogen and oxygen which often will deposit gas bubbles on aquarium walls, plants and even on the fins of fishes. If too many of these bubbles collect on a fish it may cause the

fins to become ragged and permit the growth of fungus. To avoid this the water may be aerated or allowed to stand long enough for the gas to escape.

Adequate living room

Another basic requirement is that of adequate space for the inhabitants of the aquarium. Many native fishes require more space than do tropicals of the same size since they come from cooler water and are accustomed to a higher oxygen content.

This is particularly true of freshly caught fishes. As they become acclimated to aquarium life, most species' requirements for oxygen are reduced considerably. This should not be taken to mean that they ever lose their basic oxygen requirements. It is like Mark Twain's famous horse, which he tried to train to live without food by reducing its meals a little each day. It would have worked, except that when the meals got down to one handful of hay a day, the horse died.

Keep it cool

It is difficult to keep aquariums cool in summer, so the number of fishes must be reduced. Although aeration apparently solves the problem, a good aquarist always keeps in mind the possibility of an air pump breakdown or an electrical failure which can spell disaster in a crowded aquarium. A reasonable way to figure is one inch of fish per gallon, which can be gradually increased as the fishes adjust and if they are doing well. This rule applies to smaller fishes in general, but there are exceptions. For instance, a 6 or 8 inch Largemouth Bass would be

Largemouth Black Bass, *Micropterus salmoides*. This is a large, intelligent predator which should be kept only with fishes its own size or larger.

BRAD WALKER



extremely cramped in less than 20 or 25 gallons of water, while a Bowfin of the same size could be kept in an aquarium half this size because of its ability to breathe atmospheric air. Fishes from fast-flowing waters generally require more space and aeration. Aside from increasing the oxygen content of the water and dissipating the carbon dioxide, aeration is necessary to many fast-swimming stream fishes; they will develop fungus very readily if the water is not kept moving.

Feed properly

Probably the majority of aquarium problems are caused by excessive or incorrect feeding. Healthy fishes will continually try to convince their owner that they should be fed. If they are fed as often as they appear hungry, scraps of food will invariably be overlooked. The problem with overfeeding is not that fishes eat too much, but that food will be left uneaten. Particles of food can sift underneath the sand or under rocks out of reach. Other food may remain within reach but lose palatability after a time in the water. With good filtration this waste may be partially removed and the water may remain clear but the scraps which are under the sand or rocks will eventually decay and contaminate the water.

Move the rocks periodically and stir the sand. If the undersides of rocks are black or if the sand underneath the rocks is black,

Stoneroller, *Camponotoma anomalum*. A member of the carp family, the Stoneroller has an unbelievably long intestine which encircles its swim-bladder many times. A natural scavenger, it is particularly fond of algae.

BRAD WALTON



this is an indication of uneaten food collecting. If stirring the sand clouds the water badly and causes foul-smelling gas bubbles to rise to the surface, overfeeding or overcrowding is probably responsible.

Certain foods, such as ground beef heart, must be carefully trimmed of fat before grinding since fat will not be eaten by most fishes. Juices from meat or fish leach into the water bit by bit, gradually increasing in concentration but remaining invisible. This is true also of frozen brine shrimp and daphnia, since some of the juice from these is lost in the water with each feeding. Regular partial changes of water will prevent an excessive build-up of these undesirable substances.

Undergravel filters

Undergravel filters are excellent in certain applications since they clear water quickly and if properly used will convert waste into innocuous material within reasonable limits. This type of filtration, however, has the disadvantage of "disguising" bad conditions. Uneaten food can be sucked beneath the sand where it sours, and although the water remains clear, "mysterious" deaths begin to occur. For this reason extra care should be used in feeding and the sand checked and stirred up regularly if this type of filtration is used.

4 Diseases

Wild fishes frequently are infected with parasites, especially "ich" (*Ichthyophthirius*). Due to the vastness of the natural habitats of most fishes the number of parasites which ever attach to a host is limited so that an individual fish seldom appears to be infected. In the limited space and crowded conditions of an aquarium the introduction of only a few parasites can blossom into an epidemic. Ich is recognized by the presence of tiny bubble-like cysts on the fins and bodies of the fishes.

Injuries

Injuries may have occurred in capturing or transporting the

fishes, and minnows are especially susceptible to fungus where scales have been scuffed off, etc. Wild mollies also are extremely susceptible to fungus infections.

External parasites

Velvet, flukes, anchor worms and other parasites and diseases may appear, but with much less frequency than the foregoing. Space does not permit a discussion of each of these and their cures, but your public library will have a number of tropical and coldwater aquarium books with chapters on common diseases and their cures. You can also refer to Pet Library's "Tropical Fish Diseases" (No. 322).

Salt as a remedy

Most natives tolerate salt very well and, when the aquarium is first stocked, two teaspoons of rock salt per gallon on the first day and one additional teaspoon per gallon the next day will help prevent disease. As salt does not evaporate, and therefore remains in the water, do not add more unless you change all or part of the water. A teaspoon of sulfathiazole powder dissolved in warm water and added to each 15 gallons or so of water **after the fishes are in the aquarium** will help prevent disease.

5 Spawning native fishes

Although collecting and keeping these fishes is satisfying, there are those who will want to try their hands at spawning native fishes. Most North American minnows spawn in typical barb or goldfish fashion, males driving females into plant thickets where the adhesive eggs are scattered. After spawning is completed the parents are removed as otherwise they will eat their eggs. Other minnows, members of the genus *Pimephales*, spawn under rocks in nests prepared by the males. Male carps or minnows may usually be distinguished by their brighter colors and the pimple-like breeding tubercles which they develop on the head area when in a spawning mood.

Livebearers

Livebearers drop young periodically which will sometimes escape being eaten if floating plants are provided. Separate rearing aquariums are necessary if the babies are to be saved.



ROBERT GOSSINGTON

Flagfish, *Jordanella floridae*. These are easily bred in a 2½ to 5 gallon aquarium; the male builds the nest and cares for the young. The female should be removed after spawning.

Killifish

Killies spawn in pairs, usually depositing relatively large eggs in fine-leaved floating plants. Hatching periods vary and the young can eat newly hatched brine shrimp as a first food in most instances.

Other egglayers

Sunfishes, Darters and others can be spawned on occasion, but many have special requirements such as live foods for prebreeding conditioning, or unusually large breeding quarters. Smaller sunfishes such as *Elassoma* species are certainly worth spawning and can be accommodated more easily. Most native catfishes are unlikely to spawn in the aquarium. For serious attempts at spawning any of the natives, check the available material in your local library. "Freshwater Fishes of the World" by Professor Günther Sterba describes the breeding habits of native American fishes.

Overleaf: Orangethroat Darter, *Etheostoma spectabile*.



6 Suitable aquarium fishes

Certainly among the freshwater fish species found in North America, all of those suitable for the home aquarium could not be covered in this booklet. There are, however, a number of desirable species which are either widespread or have "equivalent" species covering a wide range. In a few cases, fishes are included which have a more limited range simply because they are so outstanding and desirable.

The Bowfin

A holdout from pre-history is the bulldog-faced Bowfin, so named because of his long and powerful rippling dorsal fin. This sole survivor of a family which was a contemporary of the dinosaurs is now confined to the Atlantic slope of North America and westward into eastern Texas.

The male Bowfin is an unusually good and attentive parent and herds his little flock around protectively until he decides they are old enough to fend for themselves, at which time he often promptly begins to eat his own offspring. It is during the time when the very young fish are schooling under his care that they may often be collected in quantity by a skillful dip of the net. They often turn up in seines also, especially around vegetation.

The Bowfin in nature is a predator. His diet consists of fishes, crustaceans, insects and almost anything else he might capture including frogs, turtles and even an unwary mouse. The aquarist has little problem feeding a Bowfin, since with his insatiable appetite, he will accept anything from dog food to live crayfish. Crushed snails are relished and will be eaten by even smaller Bowfins. Since Bowfins reach a length of two feet in nature, obviously only immature specimens are suitable for the home aquarium.

The aquarium must be covered or they will jump out. On the other hand, a relatively small aquarium can be used since he is an air breather. Care must be used when handling larger Bowfins since a rather nasty bite can be inflicted by the large mouth.



BRAD WALKER

Longnose Gar, *Lepisosteus osseus*. The most common of the prehistoric Gars.

The Gars

The torpedo-bodied, armor-plated Gars are holdovers from pre-history. Their structure is one of nature's most functional designs for predation and survival. They are encased in a coat of placoid-scaled mail and have (in most species) long, narrow snouts laden with needle-like teeth for seizing a victim. It is interesting to watch a Gar juggle a mouthful around until it can be turned in the proper direction to enter the gullet.

As with many ancient fishes there is a supplementary air-breathing system to allow survival in polluted or inadequately oxygenated water. Even the eggs of Gars are poisonous which discourages dining on their caviar.

The Longnose Gar, *Lepisosteus osseus*, is the most widely distributed and the commonest of the Gars. Youngsters suitable for aquariums can be taken with a large hand net, either from a drifting boat or the bank from late spring through summer in slow-moving waters. They lurk at the surface near lily pads or other cover. If they disappear due to a disturbance, they will usually reappear shortly at, or near, the same spot.

Care is simple. Roomy aquariums are appreciated but needn't be excessively large for smaller specimens. Floating foods such as meal worms are accepted but live fishes are best. Some will take strips of beef or other foods, but food reaching the bottom will be ignored. Prey is taken with a lightning-fast sidewise strike and food is more likely to be taken if it is moving slightly,



COURTESY OF MIAMI SEAQUARIUM

Gar, *Lepisosteus platyrhincus*. A large fish requiring a great deal of swimming room.

giving the appearance of life.

Carp or Minnows

This, the largest group of freshwater fishes in the world, inhabits every conceivable type of watery environment. As one would expect, their diversity is evident in North America also. Carps and minnows of the family *Cyprinidae* contain not only fishes which prefer the darkness but sun-worshippers which put on flashing displays in the swiftest of our waters. There are scavengers, grazers and predators, and there are species of each kind suitable for the aquarium.

Perhaps the most representative group of "typical" aquarium fishes are the various members of the genus *Notropis*. Many of these are used as "fishing minnows" and, because of this, are the most likely to be encountered at the local bait house. Fast-swimming, schooling fishes, most *Notropis* species are lively and active in the aquarium and remain small enough to be easily accommodated. Fish food of every type including even inexpensive goldfish food is readily eaten and adjustment to aquarium life is usually rapid. A problem which may be encountered is the appearance of fungus in those areas where the scales have been scuffed away during capture or transportation. Heavy aeration helps prevent this since, in nature, many of them frequent running water. Two teaspoons of rock salt per gallon in the aquarium is harmless to most occupants and will help prevent fungus.

The Shiners, as the *Notropis* minnows are commonly known,

for the most part are rather subtle in coloration although there are notable exceptions such as the beautiful Red Minnow or Red Shiner, *Notropis lutrensis*, which can rival most tropicals when in breeding colors.

The Daces also are excellent aquarium fishes and contain two of our most colorful minnows, the Southern Redbelly Dace, *Chrosomus erythrogaster*, and the Blacknose Dace, *Rhinichthys atratulus*.

In many areas, the seining and trapping of bait minnows has given way to commercial raising of bait minnows in ponds. The Golden Shiner, *Notemigonus chrysroleucus*, is a commonly propagated pond-raised species and aside from being beautiful of form and manner, has an unobtrusive golden sheen which can be dazzling when light is reflected from it at the proper angle. The odd-looking Bullhead and Fathead Minnows, two *Pimephales* species, are also commonly propagated bait minnows and make fine aquarium fishes.

Bullheads and other catfishes

Outstanding among modern fishes, as far as adaptability is concerned, the Bullhead catfishes of the family *Ictaluridae* are among the best prepared for nature's emergencies. They are so prolific that their introduction into small bodies of water such as farm ponds is almost inevitably the starting point of a population explosion which soon ruins the pond for game fishes. Their

Common Shiner, *Notropis cornutus*. This is probably the most abundant fish in small streams east of the Rockies. It is not always easy to identify, as there are several color variations.

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Yellow Bullhead, *Ictalurus natalis*. While catfish are too large to spawn in the average aquarium, it is a common and delightful sight, in the spring, to see a school of baby "cats" led in close formation by the female, with the male guarding the rear.

tenacity of life is so great that even extreme drought, which results in the pond completely drying, simply sends them into the mud until the rain again fills their home with water. Releasing them into small reservoirs of this type is almost like opening Pandora's Box; it is not easy to replace the contents.

Despised as "mud cats" in the South, but somewhat more respected as food and game fishes in the North and West, Bullheads could hardly be surpassed as scavengers for the native aquarium since their relentless hunt for anything edible and their ability to withstand the aggressiveness of sunfishes and other sometimes ill-tempered natives allows them to adapt readily to this type of existence. Rockwork or other cover is appreciated since nearly all catfishes like to retire at times beneath rocks, roots or in caves. Young of most species are midnight black with white bellies, and are very handsome. Of native catfishes, only the Bullheads and the Yellow or Flathead Catfish have squared tails. The Yellow Cat has a yellowish, sometimes spotted coloration and flattened head and is generally unsuited for the aquarium since most will accept only live food, such as live fishes.

Young Channel Catfish, *Ictalurus punctatus*, and Blue Catfish,

Marbled Bullhead, *Ictalurus nebulosus*. The colors and patterns may vary, but the bullhead shape is typical and easily recognized.

BRAD WALKER



Ictalurus furcatus, are handsome fishes with silvery blue streamlined bodies and forked tails outlined with a fine black edging and are indistinguishable from one another except by a count of anal fin rays. Almost any type of meat-based food is accepted.

The venomous little *Noturus* or Madtoms are the smallest and strangest-looking native catfishes. The adipose (fat fin) is joined with the tail and also with the anal fin in one species, forming a continuous band around the rear portion of the fish. Rather shy and retiring during the day, they are just aggressive enough to enable them to hold their own with most natives.

Killifishes

The tremendous interest of the last few years in the killifishes or topminnows of the family *Cyprinodontidae* has resulted in the formation of large organizations such as the American Killifish Association and the British Killifish Association. Fanciers of these widely dispersed and interesting fishes appreciate their relatively small space requirements, interesting breeding habits and especially the toughness and long hatching periods of their large eggs. This contributes to their popularity by allowing distribution of the eggs to other breeders through the mail.

North America has a number of handsome killies, *Fundulus chrysotus*, the Golden Topminnow, is a beautiful fish which occurs through the Gulf Coast and Southern states and is often commercially available. The American Flagfish, *Jordanella floridae*, is a heavy-bodied fish with more limited distribution but with outstanding coloration. From the Southeastern U.S. comes the so-called Blue "Dace," *Lucania goodei*, which is not a Dace at all but a handsome Cyprinodont.

There are quite a number of species in the genus *Fundulus* and several of these have iridescent spots on the tops of their heads. These are the Starhead Topminnows and are quite noticeable as they cruise along at the surface of the water in search of fallen insects or other prey. An excellent example of Nature's ability to work beauty with simple colors and patterns is the handsome Blackstripe Topminnow, *Fundulus notatus*, which can be found from Iowa to Ohio and south to Mississippi, Tennessee and Texas. Very similar in appearance is *Fundulus olivaceus*.



Bluefin Killifish (Blue Dace), *Lucania goodei*. This fish has been known as a resident of the tropical aquarium for many years.

Most of the killies can be rather easily sexed since males usually have longer and more pointed anal and dorsal fins and brighter colors. If they are well fed on live and frozen foods many will spawn on fine-leaved plants such as hornwort. Unfortunately, some of our North American killies are more prone to eat their eggs than many of the foreign varieties, so the plants should be checked frequently for eggs. These are rather large and easily discernible when a light is held behind the plants.

Livebearers

Since the beginning of the tropical fish hobby, certainly the most popular group has been that family of topminnows which bear living, fully-developed young which are tiny replicas of their parents. The livebearers, or *Poeciliidae*, are found only from southern North America southward except for those species such as the common Mosquitofish, *Gambusia affinis*, and the ever-popular Guppy, which have been artificially introduced into other areas.

Gambusia affinis is probably the most readily found and collected native aquarium fish. Almost every body of water capable of supporting fish life from southern Illinois and Indiana to Florida, Texas and Mexico abounds with them and they have also been introduced west of the Rockies. The females are remarkably similar in appearance to female Guppies and in the spring and summer often appear as if they may burst with young. Just before birth even the eyes of the unborn babies can often be seen through the thin wall of the dark, so-called gravid spot which is located at the mother's vent.

Mosquitofish are not beautiful. The female is fat and drab, and the male is smaller, slender and drab. In spite of this they are interesting to watch. Like others of his family, the male possesses a long, rod-like breeding organ or gonopodium. For fishes such as Darters which require living food, Mosquitofish offspring can provide a ready supply.

Certainly the most outstanding livebearer is the breathtakingly beautiful Sailfin Mollie, *Poecilia* (formerly *Mollienesia*) *latipinna*. It is difficult or practically impossible to raise in the confines of the aquarium specimens which possess the magnificent reticulated sail of the male Sailfin, but wild-caught adult males are among the most magnificent of aquarium fishes. While they may lack the size and finnage of their male parent, well-raised second and third generation Sailfins wave a quite respectable flag if they are fed regularly and often and have plenty of room. They are also more hardy. Wild Mollies, unfortunately, are subject to various infections which they carry into captivity. They often waste away because of an inadequate amount of bulky green food such as soft algae to fill their very long intestines. Baby spinach fed regularly is a fair substitute.

An addition of three or four tablespoons of rock salt to each ten gallons of water is almost essential for newly-caught wild Sailfins and a teaspoon of sulfathiazole powder in the same amount of water will help retard fungus. Sailfins are common from South Carolina to Florida and all the Gulf Coast states.

The same general area is the habitat of what was once thought to be the smallest vertebrate and which is still the smallest livebearer. This is *Heterandria formosa*, also known as the Least Killifish. *Heterandria*, in common with *Gambusia*, is frequently

Blackstripe Topminnow, *Fundulus notatus*. This handsome minnow prefers to inhabit the upper strata of the aquarium.



known as the Mosquitofish. Unlike most livebearers, *Heterandria* gives birth to a few young at a time over an extended period, rather than one delivery, approximately every 28 days.

Sunfishes

Certainly among the most easily collected and outstanding fishes to be had are the sunfishes of the family *Centrarchidae*, since a few nearly always turn up in the net when you are seining for other fish. These are the North American equivalent to Africa's and South America's cichlids, and not only do some species furnish a great deal of sport and pan fishing in most areas, their intelligence and personalities give them a unique appeal which, combined with gorgeous colors and interesting breeding habits, make even some of the more pugnacious varieties irresistible to the aquarist.

Although the family includes the Largemouth and Smallmouth Basses, reputed to be "pound for pound the fightingest fish" (on hook and line, of course), one may also find such shy dwarfs as the Pygmy Sunfishes, *Elassoma evergladei* and *E. zonatum*. Slightly larger but every inch the gentleman is the handsome Blackbanded Sunfish, *Mesogonistius chaetodon*, an aquarium favorite since the early beginning of the hobby in this country. *Enneacanthus gloriosus* is another small and mild-mannered sunfish, or "sunny" as they are often affectionately called. This starspangled beauty is rather shy and retiring, but his beauty is worth the extra patience sometimes required to help him overcome his doubts of your good intentions.

The worm-and-bent-pin favorites of the "Huckleberry Finns"

Longear Sunfish, *Lepomis megalotis*. One of the brightly colored, larger sunfishes.



BRAS WALKER

of the country are the more boisterous members of the clan. These are the hardy panfishes such as the Bluegill and the Redbreast Sunfish. The latter, along with the Longear Sunfish and the small but scrappy Pumpkinseed, sports breeding colors that equal or surpass those of the infinitely more expensive and touchy Discus.

The majority of sunfishes are rather territorial by nature. This is especially true during the breeding season when the males assume their finest colors and fan or scoop nests out of the sand into which the females can be driven in order to deposit their spawn. After spawning, sometimes with several different females in the same nest, the male stands guard duty over his unborn young and staunchly defends the nest against invasion by any intruder. His courage is such that he will defy even fishes much larger and stronger than himself and there are few which will not fall back before his furious assault.

It is practical to attempt to spawn some of the sunfishes such as the Bluespotted (*E. gloriosus*) and the Blackbanded in the aquarium because of their small size. However, most sunfishes are so large and pugnacious at maturity that the primary concern is their requirements for maintenance. Because of the hardy nature of most, adequate room is not much of a problem if hiding places are available. In the case of some of the smaller and more secretive such as the pygmy *Elassoma* species, their 1-inch size at maturity allows one to keep and even spawn them in a 2½ or 3 gallon aquarium. Plant thickets are appreciated by these timid little creatures, and you will probably find that the more hiding spots they have available the more often they will be seen.

Larger sunfishes, such as Bluegills, Pumpkinseeds, and Green Sunfish will often remain small if they are kept together with others of the same size from the time they are about an inch or two in length. If their sizes are closely matched and retreats are available, an understanding will sometimes be worked out concerning territories. Each fish is so busy watching several others that extreme aggression against any single individual does not take place. Two fishes are less likely to get along than four or five. Species of like size may be mixed, and often an individual trouble maker—if one should turn up—can be removed. Among the larger sunfishes new introductions to an established community are not readily accepted.



BRAD WALKER

Bluespotted Sunfish, *Enneacanthus gloriosus*. A small, colorful and mild-mannered sunfish from the Eastern United States.

In states where it is legal, Bass make fine pets for those who like tanks containing one hungry, fast-growing fish which possesses unusual intelligence. These, however, are predators which feed primarily on fishes and unless you are a patient individual willing to train them to take beef heart or such, minnows must eventually be supplied.

For feeding, the "pygmies" (*Elassoma* species, Bluespotted and Blackbanded Sunfishes) will accept frozen brine shrimp and occasionally dried tropical or goldfish foods or beef heart. Larger Bluegills, Green Sunfishes, etc. will accept almost anything edible, including dried dog food which has been softened by pre-soaking. Beef heart is relished as well as live earthworms or frozen brine shrimp. Smaller Bass will accept the same, but remember: a hungry Bass can swallow a fish nearly half his size.

Perch

In North America, although there are a number of Perches which are suitable for the aquarium, a great deal of confusion results from the fact that colloquially, "perch" is often applied to members of the sunfish family. While most sunfishes are rather non-

choosy about food, the most desirable members of the family *Percidae*, the Darters, are usually determined to accept **only** live food or, in those cases where this determination can be overcome, only the very best substitutes such as frozen brine shrimp or daphnia.

Darters are most often found in clear, running water with a gravel and/or rock bottom. Some species, such as the Rainbow Darter of the Northern and Eastern states and the Greenthroat and Orangethroat Darters are breathtakingly beautiful. These are undoubtedly among the most beautiful of coldwater fishes. The rainbow color of the dorsal fins (in Perches there are two) and neon colors of the throats of the latter two rival the most colorful tropicals and make these fishes worthy of the extra care required. Other Darters, too, such as the Log Perch, *Percina caprodes*, are often handsome and always interesting.

These are bottom dwellers, inhabiting weed beds and often hiding under rocks in mid-stream. Some are found at times on sandy or gravel bottoms in lakes, almost invariably in clear

Yellow Perch, *Perca flavescens*. Small specimens make an excellent and colorful addition to the aquarium. The fish in the background is a large Brown Trout, *Salmo trutta*.

TOM GIBELLI



water. In the aquarium, their preference for highly aerated water and well planted quarters is a deciding factor in whether you will maintain them on a temporary basis or have them become established and possibly even spawn. If they are to stay in prime condition arrangements must be made to keep the water temperature at never more than mid-seventies; preferably 70 degrees or under for many species.

The name "Darter" is derived from the odd "hopping" motion of the group. Nature short-changed them in the swim-bladder department and their inability to adjust their density to that of water, and thus hover as do most fishes, makes short dashes interspersed with periods of resting on the bottom the only alternative. The seemingly waterlogged action of a Darter at leisure is deceptive, for with its streamlined form it is capable of a quite respectable burst of speed.

Best Darter collecting areas are gravel bottomed streams with fairly swift, shallow water so that a seine can be pulled rapidly upstream. Someone may go just a few feet ahead of the seine, overturning rocks in its path to uncover the Darters. Short runs with the seine may prove most effective so that these swift little creatures do not have time to regain balance and outrun the seiners. Patches of *Fontinalis* or willow moss are sometimes very productive, as is any vegetation growing in midstream in fairly swift water.

The aquarium need not be extremely large; 5 to 10 gallons will house several pairs if plenty of aeration, cool water, live food (newly hatched brine shrimp is ideal) and a fine sandy bottom, preferably with lots of vegetation, are provided. A fast-flowing filter is also helpful, almost essential.

Western fishes

It is not my intention to slight the fishes of our Western states, but their diversity and the number of fresh-water species does not approach that found on the Eastern side of the Rockies. An example is the fact that of the rather numerous sunfish tribe only one, the Sacramento "Perch," is indigenous to the Western slope.

This does not mean that there are not good aquarium fishes to be collected. While less numerous west of the Rockies, many of the Eastern families such as the cyprinodonts and suckers do have



BARRY FENOLLEY

Pike, *Esox lucius*. Small pike and pickerel are extremely hardy in the aquarium. However, unless they are well fed they are cannibalistic.

Western representatives. One may also collect introduced species such as Mosquitofish, the Bluegill Sunfish and a host of other likely prospects.

For the adventurous Western aquarist there is much to be learned about an as yet relatively unmolested fish population.

Other aquarium fishes

There are many fishes which are frequently found in North American fresh waters which would make fine aquarium fishes but it is impossible to even mention them all within the scope of this book. Two of the most important families to aquarists are the *Cichlidae* and the *Characidae*, popularly called Cichlids and Tetras, and both have managed through natural means to extend their ranges slightly north of the Rio Grande, which is the southern boundary separating the U.S. and Mexico. Each is represented by one indigenous species and the cichlid family is further represented by *Tilapia mossambica*, the beautiful African Mouthbreeder (or Mouthbrooder), through much of the same area. The latter is an escapee from the San Antonio, Texas, Zoo and has become popular with fishermen. A South American cichlid, *Cichla ocellaris*, popularly called Peacock Bass, has also been released experimentally in some Southern areas as a potential game fish.

The Mexican Tetra, *Astyanax mexicanus*, is a hardy, fast-swimming tetra with a greenish golden sheen and dental equipment capable of inflicting serious injury on smaller and more delicate fishes. The bright eye and black caudal spot belie the fact that this is the ancestor of the eyeless, unpigmented blind cave characid of Mexico. The liveliness and hardiness of this fish make it excellent for an aquarium with other sturdy natives.

The adult Rio Grande Perch, *Cichlasoma cyanoguttatum*, has a typical cichlid disposition, but kept with sunfishes of his own size a mutual state of tolerance is usually worked out. Smaller specimens have a typical, rather uncolorful cichlid look, but the adult blossoms into an olive green star-spangled beauty which like other cichlids will raise its family in cooperation with its mate. Both parents are very attentive to the young and show great "affection" for their family.

Many other notable candidates such as baby Chain Pickerel, Mud Minnows (*Umbra*), Sticklebacks, "freshwater" Flounders, Shiners, Suckers and an unlimited variety of piscatorial fauna which may from time to time come up in the net make collecting and keeping native aquarium fishes a pastime of infinite surprises as well as delights.

Spottail Shiner, *Notropis hudsonius*. This is an extremely attractive minnow with bright pink fins and a conspicuous tail spot during the breeding season. The size is convenient for the home aquarium.

BRAD WALKER



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